disability, and limiting progression of joint damage. When conservative treatment fails and joint preserving surgery is not or no longer indicated, knee replacement of the affected joint becomes necessary. A proper selection of patients for total knee replacement surgery is crucial in the light of the exponentially growing numbers with its socioeconomic impact. The present study evaluated potential radiographic and clinical predictors for clinical outcome of knee replacement surgery in a cohort of patients with end-stage knee OA treated in regular practice in an orthopedic department of a general hospital in the Netherlands.

Methods: Patients (172) with severe OA who were eligible for total knee replacement surgery in a general hospital were included. Demographics, clinical, and radiographic data were collected. WOMAC data were collected prospective pre-treatment, and after surgery (post-treatment). OARSI-OMERACT response criteria based on WOMAC questionnaires were used to evaluate clinical success. Severity of radiographic joint damage was evaluated according to Kellgren & Lawrence and Altman atlas. Pre-treatment characteristics associated with responder status were investigated using multivariate logistic regression analyses.

Results: Patients showed on average a clear improvement in WOMAC scores at a mean of 18 months post-treatment (33.0 ±20.0 improvement in WOMAC pain). Based on WOMAC response criteria 55% of the patients were classified as responders. In multivariate logistic regression, younger age (OR=0.930; 95%CI: 0.864-1.002), more severe pain (OR=0.966; 95%CI: 0.937-0.997) and more radiographic damage (OR=3.456; 95%CI: 1.568-7.618) was associated with good response. Results were similar when patients with missing outcomes were classified as non-responders or responders in a sensitivity analysis.

Conclusions: This study shows that still a significant number of patients do not have a good response to joint replacement surgery. A good response was clearly associated with more severe radiographic joint damage and possibly with age and WOMAC pain at time of operation. These results need further validation in larger cohorts and might become of use to a more accurate patient selection for knee replacement surgery.

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AGREEMENT BETWEEN METHODS TO ASSESS THE CONSTRUCT 'KNEE PAIN DURING WALKING' IN KNEE OSTEOARTHRITIS PATIENTS: A CROSS-SECTIONAL STUDY

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Purpose: Measures of pain and function are core outcomes in knee osteoarthritis (OA) in both clinical practice and research. In research settings, questionnaires are commonly used, but their applicability in clinical settings is limited due to the lack of guidelines for their application and the inability of multidimensional questionnaires to detect changes on an individual level. In clinical rehabilitation settings, performance measures are likely to be used, although no available surveys clarify the actual application. Performance tests might relate more specifically to a sensory aspect of pain than multidimensional questionnaires, which would correspond well to the target of pharmacological and exercise based treatment and therefore be more specific in evaluating the intended impacts of an intervention. A performance test with subsequent pain intensity scoring might serve as a feasible method of assessing a sensory aspect of pain, but to establish if the suspected divergence between the underlying constructs exists, the agreement between a performance pain test and a questionnaire remains to be studied. The purpose of this study was to assess the agreement between a performance pain test and a widely used multidimensional questionnaire (the Knee injury and Osteoarthritis Outcome Score, KOOS).

Methods: Cross sectional data from 143 patients with knee OA included in a prospective weight loss study (the CAROT study) were analysed. All participants rated their target knee pain, on a 100 mm visual analogue scale (VAS) after walking 150-200 m at a self-selected pace in a gait laboratory. KOOS was completed within one week prior. The KOOS pain subscale and item 5 of the KOOS pain subscale ("amount of knee pain experienced during walking on flat surface the last week", KOOSp05) were selected for analysis. Distributions of VAS scores within the KOOSp05 response categories were described and scores were compared using Spearman correlation. To support interpretability of the results, the KOOS pain subscale score was reversed to the same polarity as the VAS score (i.e. 0 = no pain and 100 = extreme pain) and agreement was estimated using Limits of Agreement.

Results: There was a moderate correlation between VAS and KOOSp05 (r = 0.5, $p<0.001$), illustrated by a wide range of VAS scores within the KOOS response categories (figure 1). The mean difference for pain scores assessed with VAS and KOOS pain subscale respectively was 18.8 (SD 16.6), with Limits of Agreement from -13.6 to 51.3 (figure 2). In general, higher pain scores were reported with the questionnaire than after the performance test.

Conclusions: The disagreement between the performance pain measure and the KOOS pain subscale together with the moderate association between VAS and KOOSp05 item scores suggest that different constructs of pain are measured, indicating that a combined performance and pain assessment method could contribute with valuable information when evaluating treatment effects, though further validation studies are required.

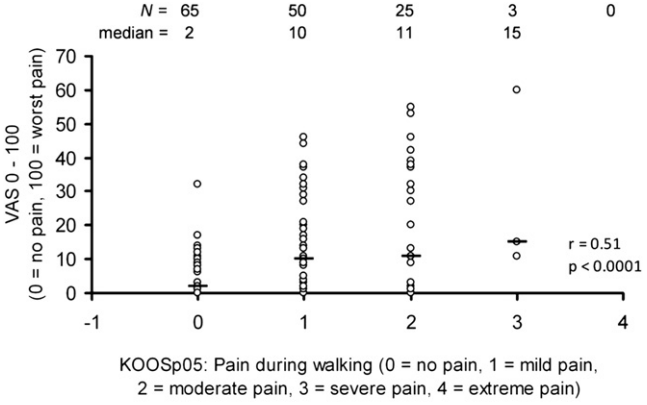

Figure 1: Distribution of Visual Analog Scale scores (0-100) within KOOS response categories (0-4) for item 5 of the pain subscale ("What amount of knee pain have you experienced the last week during walking on flat surface?"). The Spearman correlation between VAS and KOOS item scores is r = 0.51 ($p<0.001$).

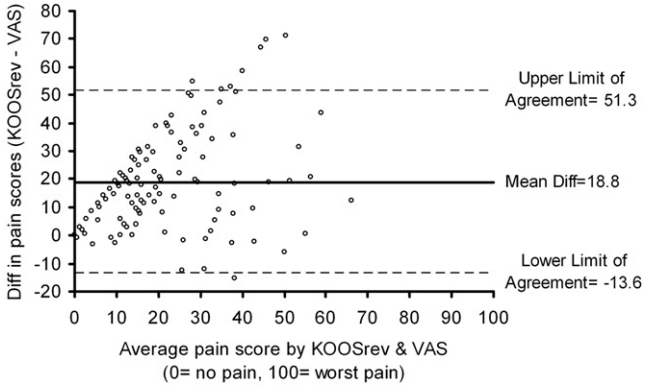

Figure 2: Difference against mean for Pain data by KOOS and VAS. Mean Difference= 18.8, Limits of Agreement= -13.6 to 51.3. KOOS is reversed to the same polarity as VAS (KOOSrev).

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KNEE FUNCTION IS SIGNIFICANTLY REDUCED IN PATIENTS WITH DEGENERATIVE MENISCUS TEARS ELIGIBLE FOR ARTHROSCOPIC SURGERY

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Purpose: Meniscectomized patients have an increased risk of developing knee OA, as the meniscal ability to resist tension, compression, and shear

stresses is reduced due to tissue removed. Impaired knee function, such as poor self-reported outcomes, muscle weakness and reduced functional performance is other suggested factors that may contribute to progression of knee OA. This study aimed to examine pre-operative knee function in middle-aged female and male patients with degenerative meniscus tears eligible for arthroscopic surgery, compared to a healthy population and the respective patient non-injured leg.

Methods: 70 patients (36% females, age (mean±SD) 49±6, BMI 27±3) with an MRI verified degenerative meniscal tear considered eligible for surgery were included. Outcome measures were the Knee injury and Osteoarthritis Outcome Score (KOOS), isokinetic knee extension and flexion muscle strength tests and three lower extremity performance tests; maximum number of kneebendings in 30s, the one leg hop for distance and the 6-meter timed hop test. The performance tests are in addition to muscle strength also dependent on the ability to switch between concentric and eccentric muscle contraction, balance and functional stability, and for the hop tests confidence in the knee.

Results: KOOS mean subscale scores ranged from 43 to 76. Mean score differences between the patients and an age matched population based reference group ranged from 13 to 38 ($p = <0.000$), Figure 1. There were no significant differences in KOOS scores between genders. The index leg was significantly weaker in isokinetic knee extension and flexion strength compared to the contralateral leg (155Nm±53 and 84Nm±27 vs. 179Nm±51 and 87Nm±24, $p \leq 0.03$). Mean differences in peak torque and total work quadriceps muscle strength compared with the contralateral leg was 15% and 14% for the females and 13% and 9% for the males, respectively. For all three lower extremity performance tests the results of the index leg were significantly worse than for the contralateral leg (number of kneebendings 26±10 vs. 28±10, $p = <0.001$, one leg hop 82±35 vs. 92±31 cm $p = <0.001$, 6-meter timed hop test 3.0±1.4 vs. 2.5±0.8 s, $p = <0.001$). Mean differences in the three tests compared with the contralateral leg ranged from 12% to 14% for the females and 5% to 12% for the males.

Conclusions: Patients with a degenerative meniscus tear considered eligible for surgery reported severely impaired pain, other symptoms, function in daily living and sports, and knee related quality of life compared to an age matched population based reference group. Muscle function in the index leg was significantly worse with up to 15% lower muscle function compared to the contralateral leg. These results suggest that risk factors for OA onset, other than intraarticular damage, are present in patients with a degenerative meniscus tear.

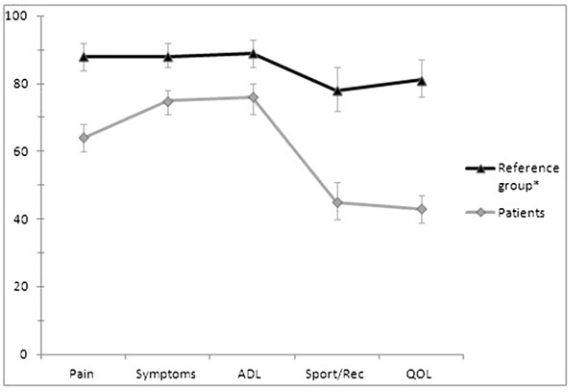

Figure 1. Mean scores with 95% confidence interval of the five subscales of KOOS for the study group (n=70) and an age matched population based reference group*. A score of 100 represents no knee problems and a score of 0 represents extreme problems.
*Paradowski et al. 2006

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FUNCTIONAL PAIN MEASURE IN KNEE OSTEOARTHITIS - A PROOF OF CONCEPT STUDY ON A NOVEL METHOD OF ASSESSING PAIN DURING FUNCTION

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Purpose: Measures of pain and function are core outcomes in knee osteoarthritis (OA) in both clinical practice and research. In order to evaluate treatment effects the target construct of an outcome measure must correspond to the target of treatment, which in pharmacological and exercise based treatment of knee OA primarily is a sensory aspect of pain. Functional Pain Measure (FPM) is a novel method to assess pain in knee OA, which is proposed to target a sensory aspect of pain by use of a pain provoking function with a subsequent pain rating. This proof of concept study aimed to explore the patient perspective with respect to face and content validity of FPM, clinical relevance and psychological process of response, and to evaluate the interpretability of results and the feasibility in clinical practice and research settings.

Methods: In this cross sectional mixed method study, 10 patients with knee OA walked on a treadmill for 10-20 minutes with self-reported habitual speed, determined before the test. Target knee pain (most symptomatic knee) was rated verbally before, every 3 minutes during and 5 minutes after walking, on a 21 point numeric rating scale (NRS, 0=no pain, 10=worst pain imaginable). Individual semi structured interviews were conducted, exploring the patient's experience of the walking task, pain and function, reflections of rating pain, attitudes towards different rating scales presented (e.g. visual analog scale, statements of pain severity, emoticons), and relevant emergent themes. The Pain Detect questionnaire, an instrument used to estimate the likelihood of a neuropathic pain component, was completed. Data were analyzed by content analysis and descriptive statistics. Interpretability and feasibility were evaluated using qualitative thematic analysis.

Results: All but 2 participants experienced pain before, during or after the walking task, as seen in figure 1. Comparison of mean NRS during walking and Pain Detect scores shows a trend of increased likelihood of a neuropathic pain component with higher pain ratings (figure 2). Generally the participants found that the walking task imitated their habitual walking pain, and expressed an increased attention to the knee pain during the test. Some participants found this attention helpful in the process of rating their pain, compared to recalling pain when filling out a questionnaire. All participants were positive towards the walking task and the NRS as a pain rating scale, and welcomed a possible implementation of FPM in clinical practice and research, although one participant experienced increased pain one week after the test (opposite knee). The test is simple to conduct, requires standard clinical skills and would be easy to implement, although limited access to a treadmill and restricted time resources might be barriers.

Conclusions: The findings suggest the FPM is a promising assessment with patient perceived face and content validity. There are indications of good concurrent validity of the FPM in relation to neuropathic pain. Ongoing development of FPM will include refining processes to increase feasibility and safety, and to establish reliability and sensitivity to change.

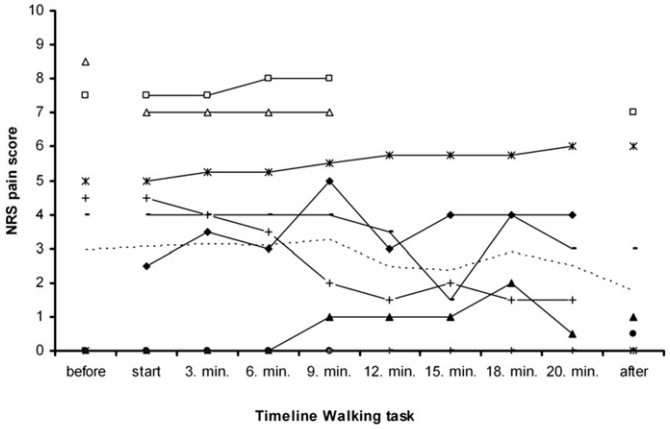

Figure 1: Individual Numeric Pain Ratings before, every 3. min. during and 5-10 min. after the walking task. Two participants reported no pain (NRS = 0), both walked for 10 min. Another two participants stopped walking after 10 min. because of pain. Dotted line indicates mean NRS scores.